



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/028,787 | 12/28/2001 | Satoshi Niiyama | 217911US0CIP | 2834 |
| 22850 | 7590 | 03/24/2004 | EXAMINER | |
| OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | DUONG, THOI V | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2871 | |

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/028,787

Applicant(s)

NIIYAMA ET AL.

Examiner

Thoi V Duong

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 ~~is/are~~ are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-24 ~~is/are~~ are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1203.
- 4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date. 1103.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the Amendment, Paper No. 8, filed August 26, 2002.

Accordingly, claims 1 and 5 were amended, and new claims 9-24 were added.

Currently, claims 1-24 are pending in this application.

Response to Arguments

2. Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

3. Claim 17 is objected to because of the following informalities: claim 17 should be dependent on claim 3 instead of claim 1 since claim 1 does not recite a second resin layer. Appropriate correction is required.
4. Claim 22 is objected to because of the following informalities: claim 22 should be dependent on claim 7 instead of claim 5 since claim 5 does not recite a second resin layer. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 5 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear how a metal-oxide layer, a first resin layer, and a second resin layer are formed in the liquid crystal optical element of the

Art Unit: 2871

current invention. Claim 5 recites a metal-oxide layer provided on at least one of the transparent electrodes and in contact with the liquid crystal layer, and a first resin layer also provided on at least one of the transparent electrodes and in contact with the liquid crystal layer. Meanwhile, claim 7 recites a second resin layer provided on the other electrode and in contact with the liquid crystal layer. The specification does not disclose this structure. Claims 6, 8, 19-21 and 22-24 are also rejected since they are dependent on the indefinite claims.

7. Claims 15 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Since claim 15 is dependent on claims 3 and 1, it is unclear how the first and second resin layers are coated on the electrical insulating layer which is formed on the other electrode. The specification does not disclose this structure.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2, 9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (USPN 6,072,558) in view of Lee et al. (USPN 6,177,973 B1).

Art Unit: 2871

As shown in Figs. 1 and 12, Tanaka et al. discloses a liquid crystal optical element comprising:

an upper substrate 5A with an upper transparent electrodes 4A;

a lower substrate 5B with a lower transparent electrode 4B (col. 38, lines 31-46);

a liquid crystal layer 21 having a memory property interposed between the substrates and (col. 35, lines 4-12 and col. 36, lines 60-66); and

a first resin layer 2B is provided on the lower transparent electrode 4B and is arranged to be in contact with the liquid crystal layer (col. 10, lines 20-29).

Re claim 2, the first resin layer 2B is provided only on the lower substrate 5B on a side opposite to an observing side (col. 36, lines 8-25).

Re claim 9, Tanaka et al. discloses that the liquid crystal optical element comprises a chiral nematic liquid crystal layer 21 (col. 10, lines 18-20).

Re claim 13, as shown in Fig. 17, Tanaka et al. discloses a color filter 10 formed on the substrate 5B (col. 39, lines 8-13).

Re claim 1, Tanaka et al. discloses a liquid crystal optical element that is basically the same as that recited in claim 1 except for said first resin layer having a rubbed vertical alignment surface.

As shown in Fig. 1A, Lee et al. discloses a liquid crystal display comprising vertical alignment film, 13 or 16, which are rubbed so that all liquid crystal molecules have a single uniform tilt angle over the vertical alignment film so as to prevent the collision between the liquid crystal molecules and hence to increase a response speed of the LCD (col. 2, lines 20-25). Thus, it would have been obvious to one having

Art Unit: 2871

ordinary skill in the art at the time the invention was made to modify the liquid crystal optical element of Tanaka et al. with the teaching of Lee et al. by forming a resin layer having a rubbed vertical alignment surface in contact with the liquid crystal layer so as to increase a response speed of the display element (col. 2, lines 20-25).

10. Claims 5 and 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Mukoh et al. (USPN 4,278,328) in view of Nishiyama et al. (Pub. No. US 2002/0057408 A1).

As shown in Fig. 2B, Mukoh et al. discloses a liquid crystal optical element comprising:

- a pair of substrates 6 with transparent electrodes 7;

- a liquid crystal layer 1 interposed between the substrates and having a memory property (col. 12, lines 23-42 and Table 4); and

- a metal-oxide layer provided on at least one of the transparent electrodes, said metal-oxide layer being in contact with the liquid crystal layer (col. 5, lines 31-48),

- wherein the paired transparent electrodes have a drive voltage of 10V applied thereacross (col. 6, lines 24-32 and col. 14, lines 50-53).

Mokoh et al. discloses a liquid crystal optical element that is basically the same as that recited in claims 5 and 6 except for a resin layer formed on the other electrode and having a rubbed vertical alignment surface in contact with the liquid crystal layer.

As shown in Fig. 3(7), Nishiyama et al. discloses a liquid crystal display comprising a alignment polyimide (resin) film 57 formed on an ITO electrode 55 and

Art Unit: 2871

having a rubbed vertical alignment surface in contact with a liquid crystal layer 59 (page 4, paragraph 61).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the liquid crystal optical element of Tanaka et al. with the teaching of Nishiyama et al. by forming a resin layer on the other electrode and having a rubbed vertical alignment surface in contact with the liquid crystal layer to obtain no leakage of light around pixel electrodes and a high contrast ratio (page 4, paragraph 66).

11. Claims 3, 4, and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (USPN 6,072,558) in view of Lee et al. (USPN 6,177,973 B1) as applied to claims 1, 2, 9 and 13 above and further in view of JP 08-220326 (JP'326).

Re claim 15, as shown in Fig. 12, the liquid crystal optical element of Tanaka et al. further comprises a second resin layer 2A provided on the upper electrode 4A, the second resin layer 2A is provided in contact with the liquid crystal layer; and an electrically insulating layer 3A coated on the upper electrode 4A, wherein said second resin layer 2A is coated on said electrically insulating layer 3A.

Re claim 16, Lee et al. discloses that the alignment layer is not subjected to an alignment treatment by rubbing (col. 3, lines 52-55).

Re claims 3 and 4, Tanaka et al. in view of Lee et al. discloses a liquid crystal optical element that is basically the same as that recited in claims 3 and 4 except that the surface hardness of the second resin layer is not disclosed. JP'326 discloses a

Art Unit: 2871

polyimide contact layer having a pencil hardness of less than HB formed on a color filter substrate to improve adhesion property and maintain high transparency (See Abstract, Table 1 and paragraph 47). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the liquid crystal optical element of Tanaka et al. with the teaching of JP'326 by forming on the other electrode a second resin having a surface hardness of B or less to improve adhesion property and maintain high transparency for the display (see Abstract).

Re claim 17, according to Table 1 of the current invention, the resin layer having a pencil hardness of B or less prevents image-sticking, thus, it is inherent that the resin layer of JP'326 having a pencil hardness of less than HB also prevents image-sticking.

Finally, re claim 14, as to the product-by-process limitation "a polyimide which has been baked," it has been recognized that "Even through product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process". *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985). See also MPEP 2113.

12. Claims 7, 8, 19 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukoh et al. (USPN 4,278,328) in view of Nishiyama et al. (Pub. No. US 2002/0057408 A1) as applied to claims 5 and 6 above and further in view of JP 08-220326 (JP'326).

Art Unit: 2871

Re claims 7 and 8, Mukoh et al. in view of Nishiyama et al. discloses a liquid crystal optical element that is basically the same as that recited in claims 7 and 8 except for a resin layer having a surface hardness of B or less. JP'326 discloses a polyimide contact layer having a pencil hardness of less than HB formed on a color filter substrate to improve adhesion property and maintain high transparency (See Abstract, Table 1 and paragraph 47). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the liquid crystal optical element of Mukoh et al. with the teaching of JP'326 by forming on the other electrode a resin layer having a surface hardness of B or less to improve adhesion property and maintain high transparency for the display (see Abstract).

Re claim 22, according to Table 1 of the current invention, the resin layer having a pencil hardness of B or less prevents image-sticking, thus, it is inherent that the resin layer of JP'326 having a pencil hardness of less than HB also prevents image-sticking.

Re claim 19, as to the product-by-process limitation "a polyimide which has been baked," it has been recognized that "Even through product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process". *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985). See also MPEP 2113.

Art Unit: 2871

13. Claims 10-12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (USPN 6,072,558) in view of Lee et al. (USPN 6,177,973 B1) as applied to claims 1, 2, 9 and 13 above and further in view of West et al. (USPN 5,453,863).

The liquid crystal optical element Tanaka et al. as modified in view of Lee et al. above includes all that is recited in claims 10-12 except for a liquid crystal layer exhibiting a planar state and a focal conic state.

Re claim 10, West et al. discloses a liquid crystal optical element comprising a chiral nematic liquid crystal layer exhibiting a planar state and a focal conic state (col. 4, lines 25-35),

wherein, re claim 11, said focal conic state produces a scattering of incident light (col. 3, lines 25-34);

wherein, re claim 12, said planar state produces a selective reflection of incident light (col. 3, lines 6-12); and

wherein, re claim 18, the liquid crystal layer also exhibits reflection characteristics as if the liquid crystal layer is a mirror (col. 4, lines 39-44)

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the LCD optical element of Tanaka et al. with the teaching of West et al. by employing a liquid crystal layer exhibiting a planar state and a focal conic state so as to realize optical multistability and haze-free light transmission at all viewing angles in both a field-on of field-off mode (col.1, lines 19-26).

Art Unit: 2871

14. Claims 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukoh et al. (USPN 4,278,328) in view of Nishiyama et al. (Pub. No. US 2002/0057408 A1) as applied to claims 5 and 6 above and further in view of West et al. (USPN 5,453,863).

The liquid crystal optical element Mukoh et al. as modified in view of Nishiyama et al. above includes all that is recited in claims 23 and 24 except for a liquid crystal layer exhibiting a planar state and a focal conic state.

Re claim 10, West et al. discloses a liquid crystal optical element comprising a chiral nematic liquid crystal layer exhibiting a planar state and a focal conic state (col. 4, lines 25-35), and reflection characteristics as if the liquid crystal layer is a mirror (col. 4, lines 39-44).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the LCD optical element of Tanaka et al. with the teaching of West et al. by employing a liquid crystal layer exhibiting a planar state and a focal conic state so as to realize optical multistability and haze-free light transmission at all viewing angles in both a field-on of field-off mode (col.1, lines 19-26).

15. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mukoh et al. (USPN 4,278,328) in view of Nishiyama et al. (Pub. No. US 2002/0057408 A1) and JP 08-220326 (JP'326) as applied to claims 7, 8 and 19 above and further in view of Tanaka et al. (USPN 6,072,558).

The liquid crystal optical element of Mukoh et al. as modified in view of Nishiyama et al. and JP'326 above includes all that is recited in claim 20 except for an

Art Unit: 2871

electrically insulating layer coated on said electrode and said second resin layer coated on said electrically insulating layer.

As shown in Fig. 12, Tanaka et al. discloses a liquid crystal optical element comprising an electrically insulating layer 3A coated on an upper electrode 4A, and a second resin layer 2A coated on said electrically insulating layer 3A (col. 37, lines 11-31).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the element of Mukoh et al. with the teaching of Tanaka et al. by forming an electrically insulating layer coated on an upper electrode, and a second resin layer coated on said electrically insulating layer so as to improve contrast ratio (col. 38, lines 16-20).

16. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mukoh et al. (USPN 4,278,328) in view of Nishiyama et al. (Pub. No. US 2002/0057408 A1) and JP 08-220326 (JP'326) as applied to claims 7, 8 and 19 above and further in view of Kumar et al. (USPN 5,936,691).

The liquid crystal optical element of Mukoh et al. as modified in view of Nishiyama et al. and JP'326 above includes all that is recited in claim 21 except that the second resin layer is subjected to an alignment treatment by rubbing. Kumar et al. discloses a method which utilizes UV light exposure for treatment of an alignment layer.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the element of Mukoh et al. with the teaching of Kumar et al. by forming a second resin layer which is not subjected to an

Art Unit: 2871

alignment treatment by rubbing so as to provide superior mechanical and thermal stability (col. 1, lines 14-20).

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (571) 272-2293.

Application/Control Number: 10/028,787

Page 13

Art Unit: 2871

Thoi Duong

03/12/2004 *JD*

JK
ROBERT H. KIM
SUPERVISOR
TECHNICAL STAFF 30